BY ORDER OF THE COMMANDER 341ST MISSILE WING

341ST MISSLE WING INSTRUCTION 21-103

1 JULY 2010

Maintenance

REPAIR AND CALIBRATION OF TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE)

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction compliments AFPD21-1, *Managing Aerospace Equipment Maintenance* and AFI 21-101, *Aircraft and Equipment Maintenance Management;* and outlines responsibilities and procedures applicable to the Precision Measurement Laboratory (PMEL), and all unit commanders, staff sections, maintenance officers, supervisors, and Test, Measurement, and Diagnostic Equipment (TMDE) coordinators and monitors at all levels of command that require support from the PMEL, Malmstrom AFB. See Attachment 1 for a list of abbreviations and acronyms. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using AF Form 847, **Recommendation for Change of Publication**; route AF Form 847 through the 341 MW publishing office. This instruction does not apply to Air National Guard (ANG) or Air Force Reserve (AFRC) personnel. Records created as a result of prescribed processes in this publication are maintained in accordance with applicable Air Force instructions, and disposed of as indicated in the Records Disposition Schedule available at **https://www.my.af.mil/gcss-af61a/afrims/afrims**/.

SUMMARY OF CHANGES

This is a revision of 341SWI 21-103, 12 Feb 2005. Some adopted forms are no longer used (para 27).

1. Responsibilities. Unit commander, staff sections, maintenance officers, supervisors, and TMDE monitors/coordinators at all levels of command that possess TMDE are responsible for ensuring compliance with this instruction.

2. TMDE Monitor/Coordinator Appointment. OWCs will appoint a primary and alternate TMDE monitor/coordinator. The appointment must be in letter format, two copies, with owning workcenter number and signed by the OWC's maintenance officer or maintenance supervisor. One copy will be sent to TMDE Scheduling and the other will be kept by the OWC TMDE coordinator.

3. TMDE Monitors/Coordinators:

3.1. The TMDE monitor/coordinator will receive orientation training from the TMDE Scheduling Section. Training sessions are scheduled by appointment. TMDE monitors/coordinators will bring the OWC TMDE Coordinator Folder to the training class. Annual refresher training is recommended and available through the Scheduling Section .

3.2. The TMDE Coordinator Folder will include as a minimum:

3.2.1. A current copy of this instruction.

3.2.2. TMDE Monitor/Coordinator Letter of Appointment.

3.2.3. OWC Master ID Listing (current corrected copy).

3.2.4. OWC Equipment Schedule (current corrected copy).

3.2.5. TMDE hand receipts from PMEL.

3.2.6. TMDE Monitor/Coordinator's Handbook and Newsletters.

3.3. Provide upon request parameters and specifications, required by the OWC for any given unit of TMDE. This will allow the PMEL to calibrate TMDE to the user's system requirements saving considerable time and money.

4. OWC Master ID Listing:

4.1. PMEL scheduler will maintain a current Master ID Listing for all equipment that lists PMEL as the performing workcenter (PWC) in PMEL Automated Management System (PAMS).

4.2. OWC Master ID Listing will be produced and distributed quarterly.

4.3. The TMDE monitor/coordinator will maintain a corrected copy of the OWC's Master ID Listing in the TMDE folder, and will:

4.3.1. Physically check each item of TMDE against the OWC Master ID Listing for ID number, serial number, and date due calibration. The certification label on the TMDE is the authority for the date due.

4.3.2. Make corrections and deletions in red ink in the OWC Master ID Listing and return the original copy to the TMDE scheduler within 10 duty days of receiving a new listing.

4.3.3. Retain a corrected copy in the TMDE monitor/coordinator's folder until the next OWC Master ID Listing is received. When a new master is received, ensure corrections are made on the new Master ID Listings.

5. Equipment Schedule Parts I, II, III:

5.1. The PMEL scheduler is responsible for producing and distributing equipment schedule parts I, II, and III monthly.

5.2. TMDE monitors/coordinators and workcenter supervisors are responsible for reviewing their equipment schedules (part III) for mission essential TMDE. Contact the TMDE scheduler if like items of mission essential TMDE are due within 15 duty days of one another, or may interfere with exercises,inspections, TDYs, or other unique requirements. The TMDE monitor/coordinator must coordinate with the TMDE scheduler 5 duty days in advance. This will ensure that calibration resources will be available to support mission-essential TMDE due calibration.

5.3. TMDE monitors/coordinators will accomplish the following on receipt of equipment schedule parts I, II, and III:

5.3.1. Review part III of listing to ensure that all TMDE due calibration is listed. Also, review those items listed in parts I and II for correct status.

5.3.2. Make corrections in red ink and return the original to TMDE scheduler within 10 duty days after receipt.

5.3.3. Use equipment schedule part III to pull TMDE scheduled for calibration.

6. Scheduling of TMDE:

6.1. Hours for pick up and delivery of TMDE will be between 0700 - 1600, Monday through Friday. PMEL will be closed on weekends and recognized holidays.

6.2. Scheduled TMDE will be delivered no later than the date due calibration. Unscheduled and initial TMDE will be scheduled by phone prior to delivery and will be delivered on the date established by the TMDE scheduler. Early or late deliveries disrupt work flow and can delay timely repair and calibration of other TMDE.

7. Unscheduled TMDE. TMDE requires a complete AFTO Form 350, **Reparable Item Processing Tag**, attached to the unit when delivered to PMEL (T.O. 00-20-2-10). The name and duty phone number of the individual who discovered the discrepancy will be put in block 14 of the AFTO Form 350 for items requiring maintenance.

8. Overdue TMDE:

8.1. The PMEL scheduler shall contact, by phone, customers who fail to deliver TMDE by the scheduled input date. This contact will be made no later than the next work day and shall provide the customer with a new delivery date for the TMDE.

8.2. When TMDE is not delivered to PMEL by close of business on the 15th day overdue, a letter will be sent to the OWC's PMEL monitor/coordinator identifying the workcenter with delinquent equipment.

8.3. Items not received within 30 days overdue, a letter is sent to the PMEL monitor/coordinator and the OWC commander and the item will be deleted from the PMEL inventory unless a valid reason is provided by the OWC (e.g., TDY, deployed).

8.4. TMDE scheduling will maintain a file of delinquency notifications.

9. Calibration Responsibility Determination. Items of TMDE that are new to the Air Force inventory may not be listed in T.O. 33K-1-100-2 or applicable weapons summaries. OWCs with such TMDE will furnish PMEL the same information provided to the Air Force Primary Standards Laboratory (AFPSL) for determination of calibration responsibility.

10. NCR/PEC and NCR/COM TMDE. All NCR items require marking in accordance with T.O. 00-20-14. Only NCR items which have limited or full repair capability will be listed on the Master ID Listing.

11. Types of Priorities:

11.1. Routine Maintenance. TMDE maintenance accomplished on a first in, first out basis. Lack of the TMDE will not cause a life threatening situation, will not cause a work stoppage or mission failure, and will not impair mission accomplishment.

11.2. Mission Essential Maintenance. TMDE maintenance accomplished ahead of routine maintenance. Lack of the TMDE may cause work stoppage or impair mission accomplishment.

11.3. Emergency Maintenance. TMDE maintenance accomplished ahead of routine and mission essential maintenance. Lack of the TMDE may cause a life threatening situation, work stoppage, or mission failure.

12. Priority Calibration or Repair:

12.1. This policy is designated to provide equipment service to all OWCs and provide work flow through the laboratory. Strict compliance with this policy is required by all OWCs to ensure effective PMEL operations, reduce backlog, and provide all OWCs with calibration equipment in a timely manner.

12.2. Workcenter supervisors will review their OWC's maintenance data collection (MDC) equipment schedule to identify priority TMDE due scheduled calibration. The TMDE coordinator will contact the TMDE scheduler before TMDE is due calibration.

12.3. Mission Essential Maintenance. TMDE requiring mission-essential maintenance shall be accomplished ahead of routine maintenance during normal duty hours. Customers requesting mission essential maintenance shall do so by letter, signed by their unit commander or equivalent.

12.4. Emergency Maintenance. Customers requesting emergency maintenance shall do so via letter through the Functional Area Chief (FAC) for approval. Request for emergency service will be accepted anytime, day or night, and PMEL will respond within 1 hour. Work on TMDE requiring emergency service will continue non-stop until the item has been completed and returned to the customer, or until it has been determined that the item requires parts or repair which cannot be accomplished in time to satisfy mission requirements. In the latter case the customer will be advised through the FAC.

13. Lateral Support Priority. When TMDE is sent to another PMEL for calibration and the OWC can justify an emergency or mission-essential priority, the PMEL scheduler will contact the PMEL performing the calibration and request priority service.

14. Condition of TMDE Delivered to PMEL. TMDE monitors/coordinators must ensure the condition of TMDE delivered to PMEL is in compliance with requirements of T.O.s 33-1-127 and 00-20-14.

14.1. All TMDE will be inspected by PMEL for the following:

14.1.1. Exterior, including air filters and ancillary equipment are clean.

14.1.2. Case finishes are correctly painted and stenciled. Hardware, latches, and hasps are properly maintained.

14.1.3. Unmated connectors are capped (do not use tape).

14.1.4. Missing or defective knobs.

14.1.5. Exposed chassis are protected and placed in plastic bag or box.

14.1.6. Leads and power cords are secured to the case.

14.1.7. Connecting cables and accessories for calibration or repair are clean and properly maintained.

14.1.8. Radioactivity Detection Indication and Computation (RADIAC) TMDE batteries are removed and placed in plastic bags, and RADIAC forms (AFTO Form 140, **RADIAC Equipment Maintenance Record**; AFTO Form 163, **Request for Limited/Special Calibration [TMDE]**, and AFTO Form 249, **TMDE Calibration Data**) are complete.

14.1.9. Fuse holders and power cords are wired in accordance with T.O. 33-1-32. ***NOTE:*** Common detachable power cords do not accompany TMDE to PMEL.

14.1.10. Correct fuses, lamps, and lenses are installed.

14.1.11. Batteries, to include soldered in type, are properly installed, charged, and not corroded or leaking.

14.2. TMDE that cannot be placed into work due to lack of organizational maintenance by the owner/ user will not be accepted by PMEL.

15. TMDE Abuse. TMDE that has been abused will be identified by letter to the OWC Maintenance supervisor for corrective action. Repetitive instances of TMDE abuse will result in refusal of maintenance or calibration services or require the procurement of replacement parts by the OWC. Improper transportation of TMDE constitutes abuse.

16. User and Owner Responsibilities. Are listed in T.O.s 00-20-14 and 33-1-27. The following are for clarification:

16.1. Should have access to and be familiar with the contents of T.O.s 00-20-14, 33-1-27, 33K-100-1, and any applicable calibration and measurement summary.

16.2. Maintain T.O.s or commercial manuals for equipment owned and provide the technical data when requested by PMEL. If data is not available or is not received in a timely manner, the equipment will be returned to the OWC and rescheduled upon receipt of the technical data.

16.3. Contact the PMEL before attempting any organizational maintenance that would require removing internal parts, assemblies, or making internal adjustments that might affect calibration of TMDE.

16.4. Ensure that components of complex test stands and checkout consoles designated PMEL, USER, USER/PMEL, or See Individual Component Listing (SICL) in T.O. 33K-1-100-1 and 33K-1-100-2 are not removed for calibration merely because TMDE components are listed individually in T.O. 33K-1-100-2. These items must be identified to the PMEL scheduler by the test stand or console part number, work unit code, and Standard Reporting Designator (SRD). Removal of these items will be placed when feasible.

16.5. Furnish PMEL with an informational copy of any action to procure new (not already supported by PMEL) TMDE which will or may require PMEL support (AF Forms 601, Equipment Action Request, AF IMT 2005, Issue/Turn In Request, and DD Form 1348-6, DOD Single Line Item Requisition System Document). This information will be used to acquire additional resources needed by PMEL to support the new TMDE. Each OWC will coordinate with PMEL before local purchase of any TMDE. Failure to follow the above may delay or prevent work from being done.

16.6. Non Air Force agencies will be responsible for providing the calibration procedure to be used or the specifications and accuracy's required when no Air Force procedure exists. It is also the OWC's responsibility to provide material resources PMEL needs to perform repair and calibration if PMEL does not have the required resources.

17. AFTO Form 255, Notice Certification Void When Seal is Broken. The AFTO Form 255 will be used at the option of the TMDE flight chief.

18. Oxygen TMDE (Including Liquid Oxygen). Workcenters having oxygen TMDE will comply with the inspection and cleaning procedures in T.O. 15X-1-102 prior to turn-in for calibration. TMDE not in compliance with the specified standards will not be accepted by the PMEL.

19. Calibration of Peculiar (PEC) TMDE. Primary responsibility for calibration of PEC TMDE rests with the OWC. OWCs with PEC TMDE calibration requirements beyond their capability should try other base resources prior to requesting assistance from PMEL. Request for PMEL support of PEC TMDE will be evaluated on a "one-time-only" basis.

20. TMDE Received from Supply. OWCs receiving TMDE from supply will leave all condition tags attached to the unit. If the TMDE is determined to be defective during initial calibration, the following procedures apply:

20.1. Test equipment issued from depot stock or shipped from manufacture will be processed in accordance with T.O. 00-32D-54 (CAT II MDR) by the OWC. PMEL will furnish technical details of rejection or failure.

20.2. If warranty repair is available on new items, they will be returned to the OWC for processing. The PMEL will furnish technical details of the rejection or failure as well as warranty and processing information.

21. TMDE Awaiting Parts (AWP):

21.1. PMEL will notify OWC TMDE monitors/coordinators within 3 duty days when their TMDE is placed in AWP status. Notification may be by telephone or letter.

21.2. It is the TMDE monitor/coordinator's responsibility to ensure that the Force Activity Designator (FAD) and Urgency Justification Code (UJC) used by PMEL are compatible with

the OWC's requirements. If the OWC requires a change, or if a (MICAP) condition has been created, then the OWC must provide PMEL a letter requesting upgrade.

21.3. OWC must submit a mission impact statement to PMEL for parts requests that do not have an estimated delivery date within 30 days. Mission impact statements should be as detailed as possible. They should state precisely how the lack of the TMDE is affecting the OWC's mission. (Are aircraft being grounded - flights delayed? Is it affecting flight safety? How is it affecting manpower, time, and effectiveness? What affect, if any, is this situation having on the total base mission?)

21.4. If PMEL has not received an acceptable estimated delivery date on the parts, or status of parts on order is unacceptable, then disposition instructions will be requested from the depot Item Manager (IM).

22. TMDE Quality Assurance. When equipment is received from the PMEL with a discrepancy, the TMDE monitor/coordinator will notify PMEL Quality Assurance and the Contract Quality Assurance Evaluator (QAE). The TMDE monitor/coordinator should have all information concerning the discrepancy. If serviceability cannot be determined, the TMDE will be rescheduled into the PMEL. If the difficulty is not resolved to the OWC's satisfaction, it should be reported to the PMEL site manager. The TMDE monitors/coordinators must validate the accuracy of certification labels on TMDE returned from PMEL. Discrepancies will be brought to the attention of PMEL Quality Assurance. All reported discrepancies will be investigated.

23. Transportation of TMDE. TMDE monitors/coordinators are responsible for the protection of TMDE being transported. Physical characteristics of individual TMDE will dictate the extent of protection required during transportation. In general, protection from the elements and from excessive shock and vibration is all that is required. In addition to the requirements in T.O. 00-20-14, the following guidelines must be followed to protect TMDE and prevent equipment downtime:

23.1. Protect knobs, dials, and meter faces.

23.2. Hog's hair, foam padding, or similar protection will be used under and between all commercial TMDE.

23.3. Plug-in units will be installed in main frames or containers with padding.

23.4. TMDE will not be stacked when transported or hand carried.

23.5. Vehicle routes will be selected to provide as smooth a ride as possible.

23.6. Only one item of TMDE will be carried in each hand.

23.7. Caution must be taken to protect equipment containing electrostatic discharge (ESD) sensitive components.

24. Mission Changes, Exercises, and Inspections. OWC supervisors will coordinate with the PMEL Site Manager as far in advance as possible for known mission changes, exercises, and inspections. This will enable PMEL to provide the best possible support to the OWC.

25. TMDE Modernization and Replacement. The PMEL Site Manager or designated representative will assist any OWC in updating or modernizing their TMDE inventories with

current-generation equipment. This service may be obtained by appointment through the PMEL scheduler.

26. Condition Tags. TMDE condition can only be determined by PMEL; therefore, all TMDE condition tags must be signed by PMEL personnel.

27. Forms Adopted.

AF Form 601, **Equipment Action Request**,
AF Form 2005, **Issue/Turn In Request**,
AFTO Form 140, **RADIAC Equipment Maintenance Record**,
AFTO Form 255, **Notice Certification Void When Seal Is Broken**,
AFTO Form 350, **Reparable Item Processing Tag**,
DD Form 1348-6, **DoD Single-Line Item Requisition System Document**

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Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

A1.1. General. Owning Workcenter (OWC) and Test, Measurement, and Diagnostic Equipment (TMDE) monitors/coordinators will be familiar with the contents of this instruction and the references listed below as they pertain to the repair and calibration of TMDE:

References

FAR 66-1, *Maintenance Management Policy*.
MACRO 66-1, *Maintenance Management Policy*.
T.O. 00-20-14, *Air Force Metrology and Calibration Program*.
T.O. 00-25-234, *General Shop Practice Requirements for the Repair, Maintenance, and Test of Electronic Equipment.*
T.O. 00-35D-54, *USAF Deficiency Reporting and Investigation System.*
T.O. 11H4-1-1, *Periodic Inspection and Certification of Federal Stock Class (FSC) 6665 Equipment and Standards.*
T.O. 15X-1-102, *General Care and Use of Oxygen Gauges and Oxygen Test Equipment*.
T.O. 33K-1-100-1 and 33K-1-100-2, *TMDE Interval, Calibration and Repair, Technical Order Guide and Work Unit Code Manual.*
T.O. 33-1-5,. *Removal of Batteries from Test Equipment in Storage/Shipment.*
T.O. 33-1-19, *General Care, Use of and Maintenance of Pressure, Vacuum, and Compound Gauges.*
T.O. 33-1-27, *Logistics Support of Precision Measurement Equipment.*
T.O. 33-1-32, *General Instructions for the Input Power and Wiring of Electrical/Electronic Support Equipment.*
T.O. 33-1-35, *Inspect Federal Stock Class Equipment and Install Warning Decal.*
T.O. 1F-16A-37, *Calibration and Measurement Summary for F-16( ) Weapon System.*

Abbreviations and Acronyms

AFTO—Air Force Technical Order
AFPSL—Air Force Primary Standards Laboratory
CBU—Calibrate Before Use
AWP—Awaiting Parts
COM—Commercial Data
ESD—Electrostatic Discharge
FAC—Functional Area Chief
FAD—Force Activity Designator
FAR—Federal Acquisition Regulation
FSC—Federal Stock Classification
MDC—Maintenance Data Collection
MICAP—Mission Capable
NCR—No Calibration Required
NDI—Nondestructive Inspection
NPC—No Periodic Calibration

OWC—Owning Workcenter
PAMS—PMEL Automated Management System
PEC—Peculiar TMDE
PMEL—Precision Measurement Equipment Laboratory
PWC—Performing Workcenter
QAE—Quality Assurance Evaluator
RADIAC—Radioactivity Detection, Indication, and Computation
SICL—See Individual Component Listing
SRD—Standard Reporting Designator
TDY—Temporary Duty
TMDE—Test, Measurement, and Diagnostic Equipment
T.O.—Technical Order
UJC—Urgency Justification Code

Terms

Test, Measurement, and Diagnostic Equipment (TMDE)—Equipment that is used to troubleshoot, perform functional test or calibration on weapon systems, aircraft, their subsystems, or the equipment in support of these systems while on the ground. This category includes aircraft and engine test cells, shop test stands, nondestructive inspection (NDI) equipment, electrical test sets, weapon systems of aircraft mock-ups, generator load banks, associated electrical and electronic supporting equipment, stationary hydraulic test stands, etc.

TMDE Monitor/Coordinator—The TMDE monitor/coordinator is assigned by each workcenter and serves as the vital link between the PMEL and OWC. The TMDE monitor/coordinator obtains calibration support for their activity, keeps the OWC informed as to the status of their TMDE, and provides advice for their Commander, Chief of Maintenance and OWC supervisors. Normally all communications from the OWC will go through the TMDE coordinator.

Peculiar (PEC) TMDE or Equipment Category 2—TMDE used to check out, measure, or maintain mission equipment and is maintained by other than the TMDE Laboratory.
Common (COM) TMDE or Equipment Category 3— Common commercial and military standard TMDE used for maintenance, troubleshooting, testing, verification, and calibration of mission equipment.

Scheduled TMDE—All items of TMDE that appear on the current Equipment Schedule.

Unscheduled TMDE—All items of TMDE requiring repair or calibration that do not appear on the Equipment Schedule.

Initial Calibration—The first calibration of TMDE after its receipt from supply or other sources.

Equipment Schedule—A monthly listing that reflects all TMDE due calibration during the scheduled period. The schedule is produced in three parts: Section I is TMDE currently overdue

calibration, Section II is TMDE currently in PMEL, and Section III is TMDE due calibration for the scheduled period listed by date due calibration.

Master ID Listing—This is a listing, produced quarterly, of all TMDE owned by a particular OWC that is supported by PMEL, listed in ID number sequence.

No Periodic Calibration Required (NPC)—TMDE that is not used to verify performance factors in support of critical equipment or support equipment can be designated NPC. TMDE used just to indicate presence of a signal or to make a measurement requiring no accuracy verification may be designated NPC.

Seldom Used, Calibrate Before Use (CBU)—TMDE that is seldom used may be designated CBU. Items designated CBU must be calibrated prior to use. CBU equipment will be identified on the Master ID Listing as "CBU." Items that are not used at least once during their calibration interval are good candidates for this designation.

Limited Calibration—Multifunction TMDE can be limited to only those functions actually used to meet job requirements. For example, a multimeter used only to measure 115 volts alternating current can be calibrated just for alternating current volts. Limited calibration is an economical practice and is required in order for the PMEL to provide the highest quality product and the best possible service.